

# The Main Project Management Problems Faced by Small and Medium Sized Civil Construction Enterprises in Brazil

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**Abstract--** This research presents the small and medium enterprises behavior in the civil construction to Problems related to the management of projects, watching them on two specific perspectives that are representative of the impact of the Problems for SMEs and the use of processes project management. the main Problems projects in general have been identified, the representativeness of the Problems for SMEs construction, project management processes most used by SMEs, the diagnosis of the relationship between the representation of the Problems and the use of processes; and also, pointed out a comprehensive solution to minimize project management Problems and their impacts.

**Index Term--** Project Management, Small and Medium-Sized Enterprises, Civil Construction, Management Processes, Monitoring and Controlling.

## 1. INTRODUCTION

According to the PMI 2013 projects, programs and portfolios are the best way in which organizations can reach their objectives. Projects are the civil construction Enterprise's business. Enterprises with this purpose should be structured to attend the daily necessities of the project management daily routine, because it is known that project management is a rather dynamic environment in which changes can occur every moment, so problems with an urge to be quickly solved emerge often. The responses to these problems should be given in a well-structured manner so that they will not happen again and do not damage the Enterprise's image in relation to its clients.

In this research we will look forward to answering the following question: which are the project management problems which are most significant to the SME in the construction field and which is the relation between these problems and the project management. That is, our main goal is to identify the relationship between representativeness of the project problems and the use of project management processes in the SME of the civil construction area.

In order to reach the main goal of this research we will try to attend the following specific objectives: Identify the main problems related to project management; Identify the representativeness of the problems related to project management in the Small and Medium-Sized Enterprises; Identify the most used processes in Small and Medium-Sized Enterprises from the processes suggested by the PMI (2013); Diagnose the relation between project problems representativeness and the use of project management processes; and propose a global solution to minimize the

problems involving project management faced by Small and Medium Sized construction companies.

## 2. PROJECT MANAGEMENT PROCESSES

According to the PMI (2013) projects have five stages (Initiating, Planning, Executing, Monitoring and Controlling and Closing). Each one of these phases is consisted of a project management process group. Processes are also divided in ten knowledge areas in project management, which are: Integration, Scope, Time, Cost, Quality, Human Resources, Communications, Stakeholders, Risks and Procurement. Each one of these areas has specific processes. We can describe the basic concepts and the corresponding processes of each one of the knowledge areas in project management as follows:

**Project Scope Management:** The goal here is to describe the steps and guidelines to assure that all of the needed work to successfully conclude the project is done. The processes of the scope knowledge area are: Plan Scope Management, Collect Requirements, Define Scope, Create WBS, Validate Scope and Control Scope.

**Project Time Management:** Here, the aim is to describe the steps and guidelines so that the project is finished on time. The processes of the time knowledge area are: Plan Schedule Management, Define Activities, Sequence Activities, Estimate Activity Resources, Estimate Activity Duration, Develop schedule and, finally, Control Schedule.

**Project Cost Management:** here, the goal is to describe the steps and guidelines to manage the project's Closing in the given budget. The processes of the cost knowledge area are: Plan Cost Management, Estimate Costs, Determine Budget and Control Costs.

**Project Quality Management:** its goal is to describe the quality policies, objectives and responsibilities for the project to satisfy the needs for which it was undertaken. The processes of the quality knowledge areas are: Plan Quality Management, Perform Quality Assurance and Control Quality.

**Project Human Resources Management:** the main goal here is to describe the project steps and guidelines to organize and manage the project team. The processes of this knowledge area are: Plan Human Resource Management, Acquire Project Team, Develop Project Team and Manage Project Team.

**Project Communication Management:** the objective here is to describe the stages and guidelines to assure that the project information is being generated, collected,

distributed, stored, recovered and organized in the right manner. The Processes of this knowledge area are: Plan Communications Management, Manage Communications and Control Communications.

**Project Stakeholder Management:** it has the aim to depict the stages and guidelines to manage the expectations and to monitor the behavior of the stakeholders involved in the project during its development. The processes of this knowledge area are: Identify Stakeholders, Plan Stakeholders Management, Manage Stakeholder Engagement and Control Stakeholder Engagement.

**Project Risk Management:** here, the goal is to describe the guidelines and stages to increase the probability and the impact of positive events and to reduce probability and impact of the negative ones. The processes of this knowledge area are: Plan Risk Management, Identify Risks, Perform Qualitative Risk Analysis, Perform Quantitative Risk Analysis, Plan Risk Responses and Control Risks.

**Project Procurement Management:** the aim is to describe the steps and guidelines to buy all the material and services needed for the activities' Executing. The processes of this knowledge area are: Plan Procurement Management, Conduct Procurement, Control Procurements and Close Procurements.

**Project Integration Management:** the objective here is to describe the stages and guidelines as to identify, define, combine, unify and coordinate the processes of the integration knowledge area, which are: Develop Project Charter, Develop Project Management Plan, Direct and Manage Project Work, Manage and Control Project Work, Perform Integrated Change Control and Close Project or Phase.

### 3. PROJECT MANAGEMENT PROBLEMS

To identify the main Problems related to project management we will use a research performed in 2010 as a reference, in which were included 460 public and private organizations from distinct areas that pointed out the most frequent Problems in their respective projects. According to TERRIBILI (2013), 18 different Problem kinds faced by the enterprises and their respective frequency and relevance for

the Enterprises were pointed out. These problems were identified in their current relevance sequence:

Table I  
Project Management Problems Mentioned by Organizations.

#	Project Management Problems	% Mentioned
1	Deadlines not being met.	60,2%
2	Constant scope changes.	43,0%
3	Communication problems.	40,1%
4	Inadequate scope definition.	39,5%
5	Budget not met.	28,3%
6	Insufficient human resources.	28,3%
7	Competition between daily routine work and the project itself in the use of resources.	27,6%
8	Non-correctly evaluated risks.	22,9%
9	Constant priority changes or lack of priority.	19,8%
10	Problems with suppliers.	17,7%
11	Incorrect or unfounded estimates.	15,6%
12	Rework due to lack of product quality.	11,7%
13	Lack of responsibility definition.	10,2%
14	Lack of support methodology.	7,5%
15	Lack of support from the senior management or from the <i>sponsor</i> .	7,3%
16	Lack of competency to manage projects.	6,9%
17	Lack of an aid tool.	6,7%
18	Lack of technical knowledge over the enterprise's business or area.	2,1%

Source: Adapted by the author (TERRIBILI, 2013).

### 4. DEVELOPMENT METHODOLOGY

The research was done through the deductive-hypothetical method and the data collection was performed based on two questions related to the project management theme. The interview was held and the data was tabulated through the *Likert*, obeying a scale which goes from 1 to 5, where 1 represents smaller intensity and 5 greater intensity. In this research we present the existing relationship between the most frequently faced problems in projects and the use of project management Processes. The relation between them is given through project management knowledge areas, as it can be seen in the picture below:



Fig. 1. The relation between Problems and project management Processes

Source: Adapted by the author.

The first question asked makes reference to the main project management Problems faced by Small and Medium-Sized Enterprises. This way, we identified the frequency in which each problem occurs and the impact generated over the Enterprise. The following question was asked: **Which**

**problems related to Project Management are most representative in your opinion?**

According to Terribli (2013), we have a representativeness scale of the most frequent Problems faced by different enterprises. With this scale, it is possible to elaborate the

first research hypothesis, which is: *The project management problems representativeness pointed out by various enterprises of different segments is the same to the Small and Medium-Sized Enterprises of the construction branch.*

Based on the most frequent problems found in projects, indicated by TERRIBILI FILHO (2013), the 15 most

relevant ones were selected for the construction field in general. The problems selected were classified by the interviewee through the *Likert* scale. The relation between the knowledge areas and the identified problems is listed below.

**Chart 01:** The relation between Problems and knowledge areas' processes.

Knowledge Area	Problem
Scope	Constant scope changes
	Inadequate scope definition
Time	Deadlines not being met
Cost	Budget not met
Quality	Rework due to lack of product quality
Risk	Non-correctly evaluated risks
Human Resources	Insufficient human resources
	Lack of competency to manage projects
Procurements	Problems with suppliers
Communication	Communication problems
Stakeholders	Communication problems
	Lack of support methodology
Integration	Incorrect or unfounded estimates
	Lack of responsibility assignment
	Competition between daily routine work and the project itself in the use of resources
	Constant priority changes or lack of priority

**Source:** Adapted by the author (TERRIBILI, 2013).

The second question is related to the project management processes used by Small and Medium-Sized Enterprises. This way, the importance attributed to each one of the project management processes is identified. The second question made was: *Which processes related to Project Management (pointed out by the PMI as best practice) are used by the Enterprise in the Initiating, Planning, Executing, Monitoring and Control and Closing?* The list of processes was elaborated based on the 47 project management pointed out by the PMI (2013) as presented earlier.

The second hypothesis of the research was: *The lower the use of project management Processes and, consequently, of a knowledge area the bigger the representativeness of the Problems faced by the Enterprises.*

The data collection was performed through interview and 8 construction field enterprises evaluation. In the attachment I

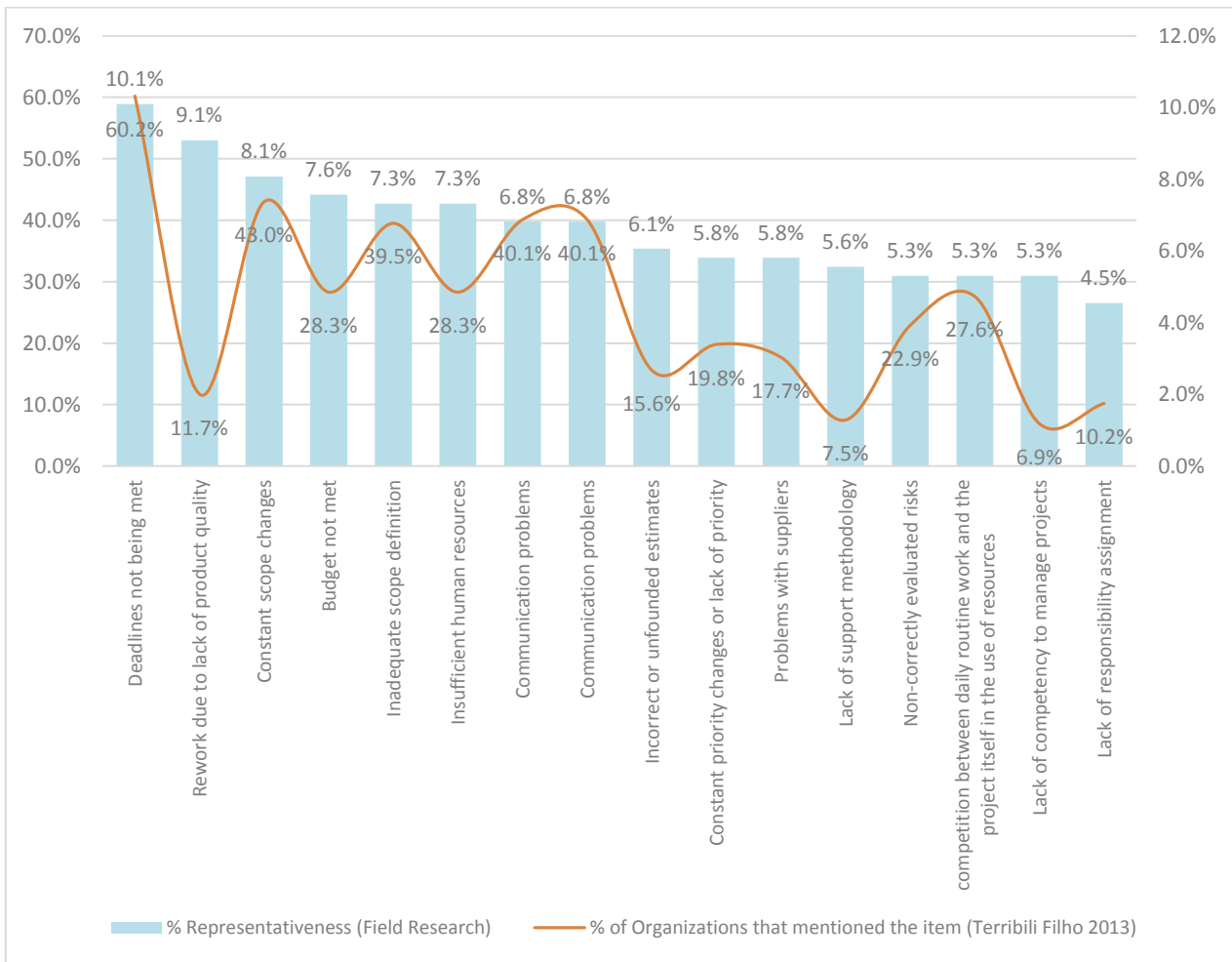
the questionnaire with the answers given by the interviewed enterprises can be found.

## 5. RESULTS AND DISCUSSIONS

With the purpose of validating the study's hypotheses some analyses were performed and are going to be presented from the sample of the small and medium sized construction field Enterprises researched.

In order to answer our first hypothesis we analyzed comparatively the representativeness of the project management Problems faced by Small and Medium Sized Enterprises in relation to the other enterprises researched by TERRIBILI (2013).

**Graphic 01:** The representativeness of Small and Medium-Sized Enterprises faced Problems x Enterprises in general.



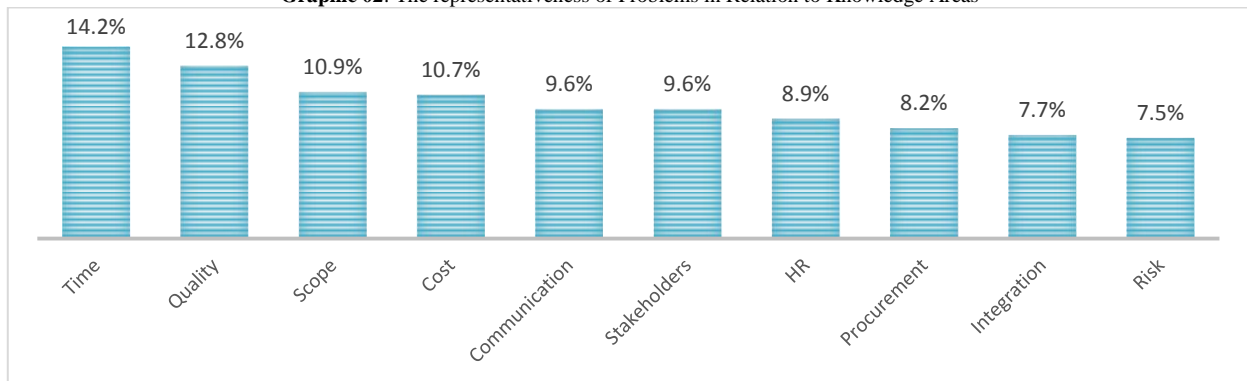
**Source:** Field Research Analysis (Attachment I) (Adapted from Terribili 2013)

Through this analysis we found that the scale of representativeness of the project management Problems faced by Small and Medium-Sized Enterprises is not the same pointed out by TERRIBILI (2013), where different enterprises of different segments were researched.

knowledge area the bigger the representativeness of the Problems faced by the Enterprises”, we have used the collected data and have identified the percentage of representativeness of the Small and Medium Sized construction field project management Problems in relation to each knowledge area in project management.

To confirm the second hypothesis of this research, which is “The lower the use of project management Processes or of a

**Graphic 02:** The representativeness of Problems in Relation to Knowledge Areas



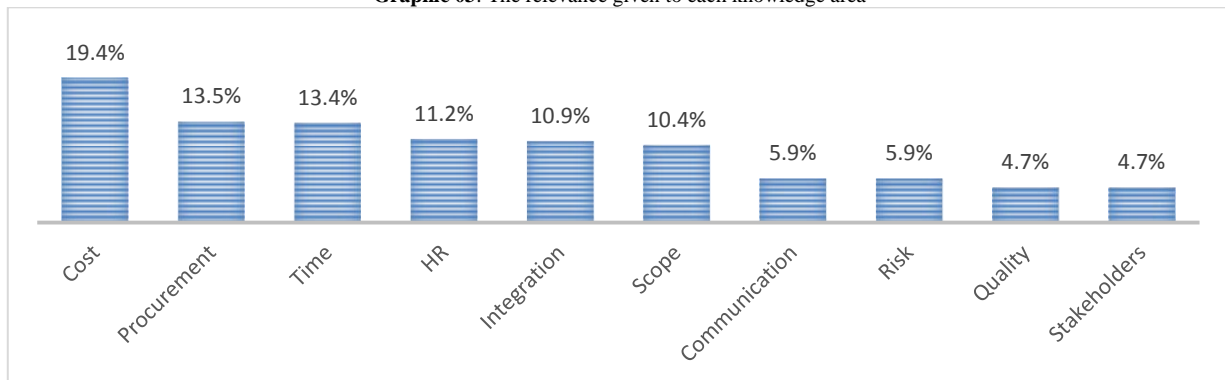
**Source:** Field Resource Analysis (Attachment I)

With this information we can identify the project management knowledge areas most affected by most frequent Small and Medium-Sized Enterprises problems pointed out by TERRIBILI (2013). And the most affected areas are time, quality, scope, cost and communication. According to TERRIBILI (2013), a general solution suggested to reduce the project management problems is monitoring the project's performance. According to him, the projects enable the accomplishment of measures which help in diagnosing the conditions of normality or abnormality in some operational aspects as, but not limiting itself to them: cost, deadline, quality, communication, risks, client's

satisfaction and staff. The author continues by mentioning some performance indicators used as market standards, which are CPI (*Cost Performance Index*) e SPI (*Schedule Performance Index*), which are directly linked to the management of the project's added value. The aim of these performance indicators is to help in the early identification of potential problems in diverse project's aspects.

In a similar way, we evaluate the percentage of relevance given by the construction field Small and Medium-Sized Enterprises to each project management's knowledge area.

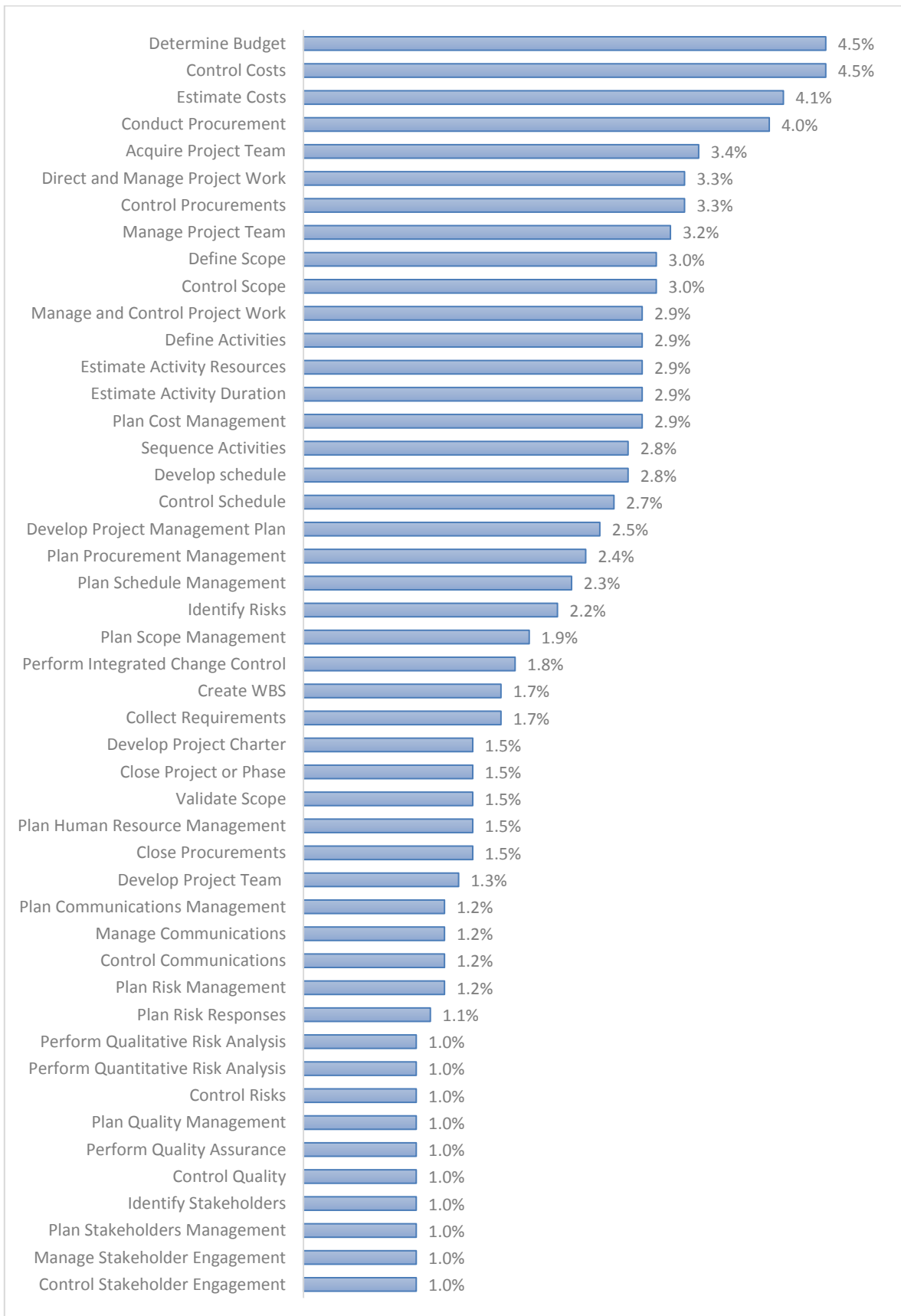
**Graphic 03:** The relevance given to each knowledge area



**Source:** Field Resource Analysis (Attachment I)

This way, we determine that the knowledge areas which receive more attention from the Small and Medium Sized construction field enterprises are: cost, procurement, time, human resources and integration. For complementation, we evaluated the importance SME enterprises give to the project management processes presented by the PMI (2013).

**Graphic 04:** The importance given to Project Management Processes



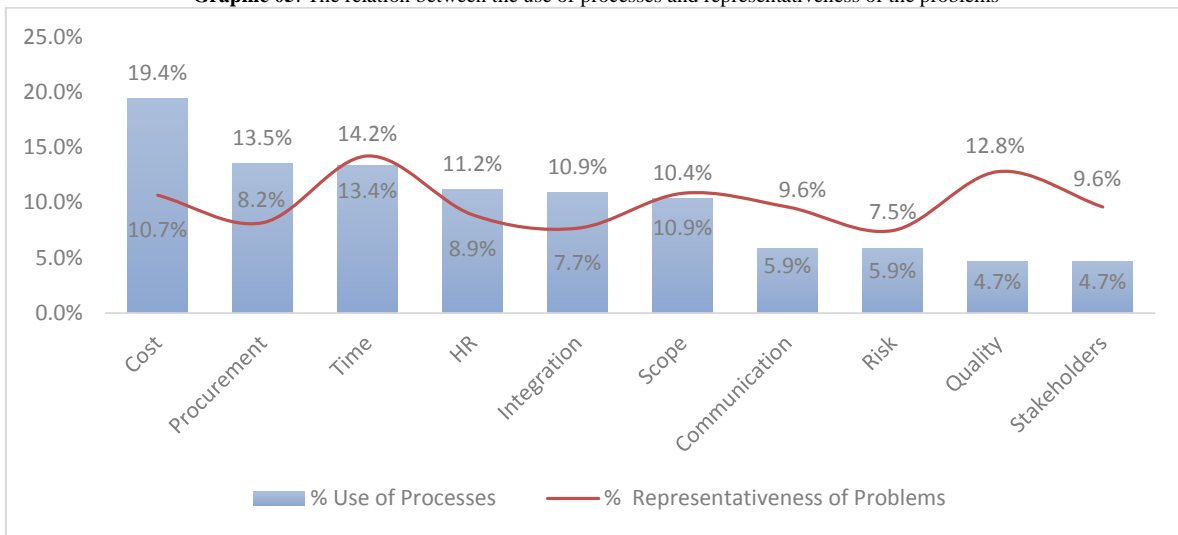
Source: Field Resource Analysis (Attachment I).



MELLO, AMORIM, BANDEIRA (2008), in their research compared the performance of the construction field Small and Medium-Sized Enterprises which adopt measure criteria and indicator systems with those which do not. The authors evinced that the indicator “Planning Efficiency” is better in enterprises which were certified than in the other ones, that is to say, we can state that the efficiency in planning

activities and projects is bigger in enterprises that have a management system with performance indicators. We have used the same relation to evince the representativeness of the project problems with the use of project management processes and knowledge areas.

**Graphic 05:** The relation between the use of processes and representativeness of the problems

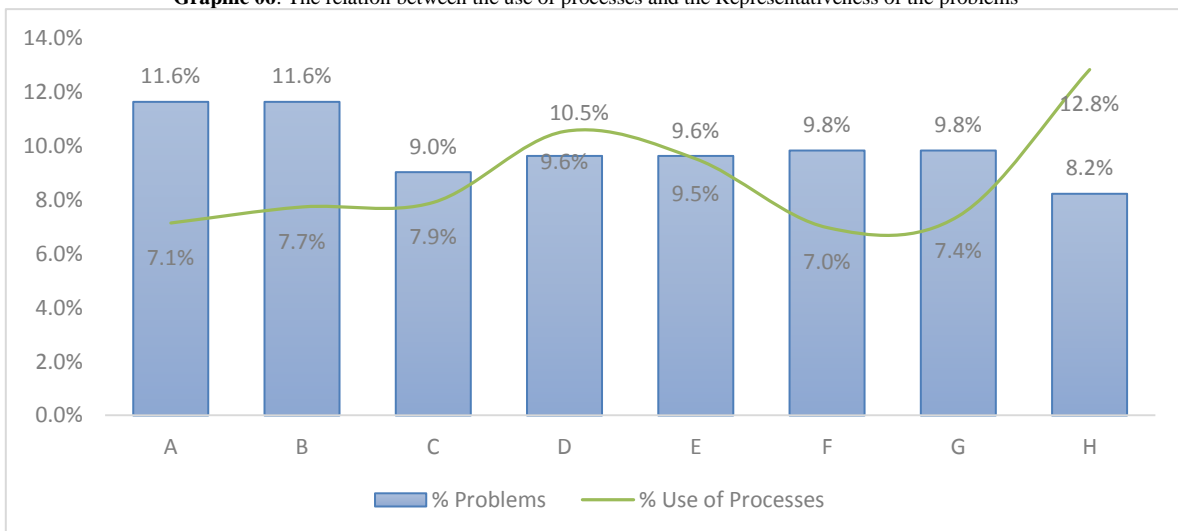


**Source:** Research Analysis (Attachment I)

Through this analysis we have answered to the second hypothesis and came to the conclusion that the bigger the use of knowledge areas and project management processes the lower the representativeness of the problems faced by SME. To confirm this analysis, we have evaluated the

enterprises comparing the use of project management processes with the representativeness of the problems faced in their projects.

**Graphic 06:** The relation between the use of processes and the Representativeness of the problems



**Source:** Field Research Analysis (Attachment I).

So we have highlighted, in addition, that the bigger the use of project management processes the lower the representativeness of the problems in the Small and Medium-Sized Enterprises projects. A solution which adds

to the improvement of the projects besides the monitoring and the performance indicators afore mentioned is the use of technology. According to COMIN, KLEIN, RIGONI (2014) the use of mobile technology can contribute directly to the

project's performance improvement once the mobile technology ease up the process monitoring and control, especially when the processes are related to time management, which had the biggest representativeness among the problems pointed out.

## 6. CONCLUSION

This research was really important for our comprehension and deepening is this theme, because the Small and Medium Sized Brazilian Enterprises represent, according to SEBRAE (2016), 27% of the country's GDP and 52% of the regularly employed people in the country. With no doubt, the SME in the construction area are quite responsible for this proportion of benefits for the country.

In this research the main problems referring to project management were identified, the representativeness of the problems referring to project management in SME, the project management processes which are most used by these SMEs, the diagnosis of the relation between the representativeness of the project problems and the use of project management processes; and still, a global solution to minimize the project management problems suffered by the construction field SMEs.

The purpose of this work was to identify the relation between the representativeness of the project's problem and the use of project management processes in SMEs of the construction area. We have come to the conclusion that the main goal was achieved because it has been presented the relation between the use of project management processes and the project problems faced by Small and Medium Sized Enterprises, in which we found out that the lower the use of project management use the bigger the representativeness of the problems to the Enterprises. That said, we have concluded that in order to reduce project management problems for the construction field SMEs,

these Enterprises should devote additional efforts on the systematic use of project management processes which are included in the 5 stages of a project – mainly in the planning, monitoring and control ones – and in the ten knowledge areas. By doing so, the Enterprises will benefit from some advantages such as: systemic vision of the projects, process optimization, risk reduction, deviation minimization, communication improvement and more. With these benefits, the Small and Medium Sized construction field Enterprises will certainly expand their project success range.

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ATTACHMENT I – FIELD RESOURCE QUESTIONNAIRE

The objective of the research is to show the behaviour of Small and Medium-Sized construction enterprises concerning the "strategic planning" and "project management" themes. Thus, 07 questions will be asked in order to help on our diagnosis. The responses shall be given through the quantification in a scale where 1 a must be considered a lower intensity practice and 5 a higher one performed by the enterprise (CHECK THE RESPONSES WITH NA "X").	Enterprise A	Enterprise B	Enterprise C	Enterprise D	Enterprise E	Enterprise F	Enterprise G	Enterprise H	Sum
	<b>1 - Which problems related to Project Management are most representative in your opinion?</b>	<b>58</b>	<b>58</b>	<b>45</b>	<b>48</b>	<b>48</b>	<b>49</b>	<b>49</b>	<b>41</b>
Deadlines not being met	5	5	5	5	5	5	5	5	40
Rework due to lack of product quality	5	5	4	4	5	4	5	4	36
Constant scope changes	5	2	5	4	4	3	5	4	32
Budget not met	3	3	4	5	4	4	3	4	30
Inadequate scope definition	5	5	4	3	3	3	3	3	29
Communication problems	5	3	3	3	3	4	3	3	27
Insufficient human resources	1	5	4	3	5	4	4	3	29
Constant priority changes or lack of priority	5	4	3	3	2	2	2	2	23
Non-correctly evaluated risks	5	5	1	2	1	3	2	2	21
Incorrect or unfounded estimates	3	5	2	3	3	2	3	3	24
Competition between daily routine work and the project itself in the use of resources	3	3	1	3	2	5	2	2	21
Problems with suppliers	3	5	2	3	2	2	4	2	23
Lack of support methodology	5	3	2	2	3	3	3	1	22
Lack of competency to manage projects	4	2	2	2	3	4	3	1	21
Lack of responsibility definition	1	3	3	3	3	1	2	2	18
<b>2 - Which processes related to Project Management (pointed out by the PMI as best practice) are used by the Enterprise in the Initiating, Planning, Executing, Monitoring and Control and Closing?</b>	<b>84</b>	<b>91</b>	<b>93</b>	<b>124</b>	<b>112</b>	<b>82</b>	<b>87</b>	<b>151</b>	
Determine Budget	5	5	4	5	5	4	4	5	37
Control Costs	5	4	3	5	5	5	5	5	37
Estimate Costs	5	5	3	4	4	4	4	5	34
Conduct Procurement	2	5	4	5	5	4	4	4	33
Acquire Project Team	3	3	4	4	4	3	3	4	28
Direct and Manage Project Work	3	3	4	4	4	3	3	3	27
Define Scope	3	3	3	3	3	2	3	5	25
Control Scope	3	3	3	3	3	2	3	5	25
Control Procurements	2	4	3	4	5	3	3	3	27
Manage and Control Project Work	2	2	4	4	3	2	2	5	24
Define Activities	2	3	3	4	3	2	2	5	24
Estimate Activity Resources	2	2	4	4	3	2	2	5	24
Estimate Activity Duration	2	2	4	4	3	2	2	5	24
Plan Cost Management	3	3	1	3	3	3	3	5	24
Manage Project Team	3	2	3	4	4	3	3	4	26
Sequence Activities	2	2	3	4	3	2	2	5	23
Develop schedule	3	2	2	4	3	2	2	5	23
Control Schedule	2	2	2	4	3	2	2	5	22
Plan Procurement Management	1	3	1	4	4	1	2	4	20
Develop Project Management Plan	1	2	3	4	3	2	2	4	21
Plan Schedule Management	1	1	1	4	3	2	2	5	19
Plan Scope Management	1	1	2	3	2	1	1	5	16
Identify Risks	2	3	2	3	2	2	2	2	18
Create WBS	1	1	1	3	2	1	1	4	14
Perform Integrated Change Control	2	1	1	2	2	1	2	4	15
Collect Requirements	1	1	2	2	2	1	2	3	14
Develop Project Charter	1	1	1	3	1	1	1	3	12
Close Project or Phase	1	1	2	2	1	1	1	3	12
Plan Communications Management	1	1	1	1	1	1	1	3	10
Manage Communications	1	1	1	1	1	1	1	3	10
Control Communications	1	1	1	1	1	1	1	3	10
Plan Risk Management	1	1	1	1	1	1	1	3	10
Validate Scope	1	2	1	2	1	1	1	3	12
Plan Human Resource Management	1	1	1	2	3	1	1	2	12
Close Procurements	1	1	2	2	2	1	1	2	12
Develop Project Team	1	2	1	1	3	1	1	1	11
Plan Risk Responses	2	1	1	1	1	1	1	1	9
Perform Qualitative Risk Analysis	1	1	1	1	1	1	1	1	8
Perform Quantitative Risk Analysis	1	1	1	1	1	1	1	1	8
Control Risks	1	1	1	1	1	1	1	1	8
Plan Quality Management	1	1	1	1	1	1	1	1	8
Perform Quality Assurance	1	1	1	1	1	1	1	1	8
Control Quality	1	1	1	1	1	1	1	1	8
Identify Stakeholders	1	1	1	1	1	1	1	1	8
Plan Stakeholders Management	1	1	1	1	1	1	1	1	8
Manage Stakeholder Engagement	1	1	1	1	1	1	1	1	8
Control Stakeholder Engagement	1	1	1	1	1	1	1	1	8